Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– V (NEW) - EXAMINATION- WINTER 2018

Subject Code: 2150610 **Date: 27/11/2018**

Subject Name: Advance Structural Analysis

Time:10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Explain any two types of skeleton structures with their internal forces and deformations.	**03**
	(b)	A conical dome of 20m diameter at base and 4m rise subjected To udl of 4kN/m^2. Determine maximum meridional thrust and hoop force in the dome.	**04**
	(c)	Derive equations of shape factor of (i) circular section (ii) square section	**07**
Q.2	**(a)**	Define: 1. Flexibility 2. Stiffness 3. Shape Factor	**03**
	(b)	Calculate the shape factor of section shown in **Fig.01.**	**04**
	(c)	Analyze the frame as shown in **fig.02** by stiffness method.	**07**
		OR	
	(c)	Analyze the beam as shown in **fig.03** by flexibility method.	**07**
Q.3	**(a)**	Enlist various types of domes. Show the nature of the stresses developed in conical dome with neat sketch.	**03**
	(b)	Determine the redundant Q_1 and Q_2 for the beam shown in **fig.04.**	**04**
	(c)	Derive the formula for Mp required for the propped cantilever beam loaded by a collapse uniformly distributed load of Wc kN/m.	**07**
		OR	
Q.3	**(a)**	Write different uses of domes.	**03**
	(b)	Find the collapse load for a fixed beam of span L and subjected to an UDL of w/unit length using static method and kinematics method.	**04**
	(c)	A fixed beam of 6m span carries a central point load of 100kN. Determine plastic moment and plastic section modulus required. Take fy = 250 N/mm^2.	**07**
Q.4	**(a)**	Determine the shape factor for circular section of diameter D.	**03**
	(b)	For the **Fig.05,** determine final end moments by stiffness method of analysis.	**04**
	(c)	A spherical dome has base diameter of 12 m and rise of 2.75 m carries a live load of 3.0 kN/m^2. Calculate the meridional and hoop stress at phi = 30º and at ring beam level. Assume thickness of dome is 14 cm and density of dome material is 25 kN/m^3.	**07**
		OR	
Q.4	**(a)**	Define: 1. Mechanical hinge. 2. Plastic hinge. 3. Plastic modulus of section.	**03**
	(b)	Differentiate between Force Method and Displacement Method of Analysis.	**04**
	(c)	Give the characteristics of flexibility and stiffness matrix.	**07**
Q.5	**(a)**	Write the steps of Flexibility method of analysis.	**03**
	(b)	State the assumptions in plastic analysis.	**04**

	(c)	State: (1) Upper bound theorem and (2) Lower bound theorems for Collapse load in plastic analysis.		**07**

OR

Q.5	**(a)**	Derive the equation of collapse load for the propped cantilever beam subjected to central point load.		**03**
	(b)	State and explain in brief various collapse mechanism of a frames in plastic theory with neat diagrams.		**04**
	(c)	Derive equation of collapse load for the propped cantilever beam subjected to uniformly distributed load.		**07**

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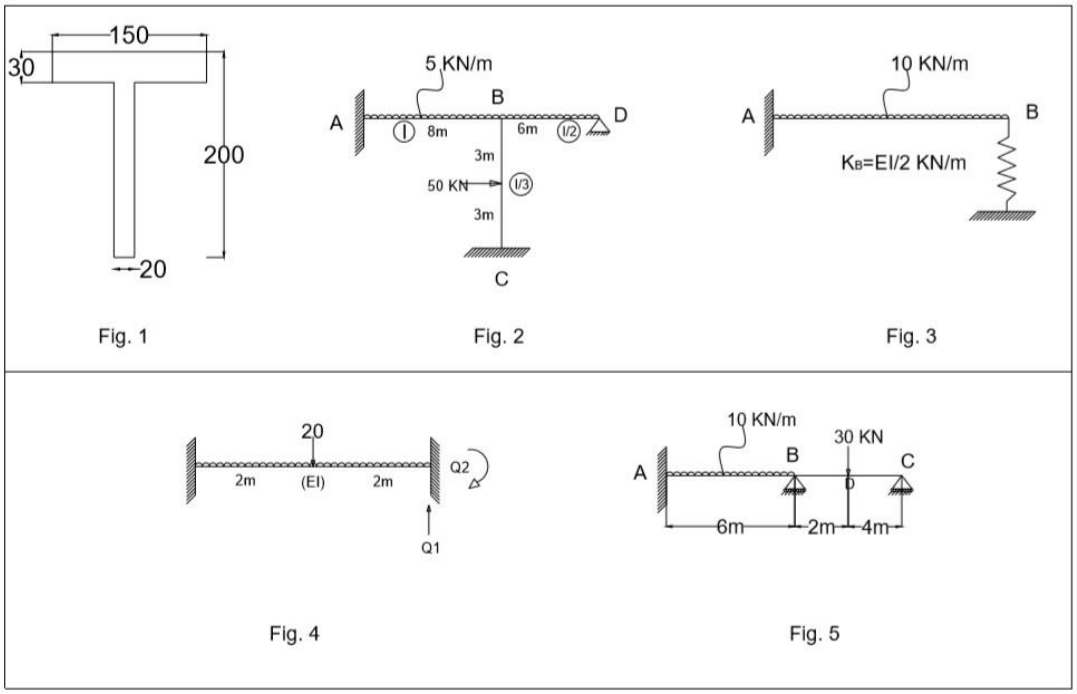

Fig. 1 Fig. 2 Fig. 3

Fig. 4 Fig. 5